



Pest Management in Winter Cereals



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Key Pests

Crop stage/ Pest	Emergence	Vegetative	Flowering	Heading	Grainfill
Cutworm					
Mites					
Wireworms/ False Wireworms					
Black-headed cockchafer					
Aphids					
Armyworm					
Helicoverpa spp.					



Risk Management Table

High risk	Reduced risk	Low risk
Aphids & BYD Virus		
<ul style="list-style-type: none"> • Wet summer & green bridge • Wet autumn, early sowing • Warm, dry growing season 	<ul style="list-style-type: none"> • Alternative hosts controlled pre-season • Large numbers aphid predators and/or aphid mummies 	<ul style="list-style-type: none"> • Dry, cool summer; wet, cool winter • Heavy grazing to reduce plant/weed hosts
Armyworms & Helicoverpa		
<ul style="list-style-type: none"> • After periods of drought • Adjacent pastures chemically fallowed, spray topped or cultivated in spring 	<ul style="list-style-type: none"> • Large numbers wasp parasitoids • Weed control 	<ul style="list-style-type: none"> • Wet winter/spring



Aphids



Pest ID: Key Aphid Species



- Oat aphid
 - July to end Aug*
 - Crown and lower stems
- Corn aphid
 - mostly barley
 - Aug to early Sept
 - Whorl and top leaf axis
- Rose-grain aphid
 - Uncommon & sporadic
 - Upper leaves





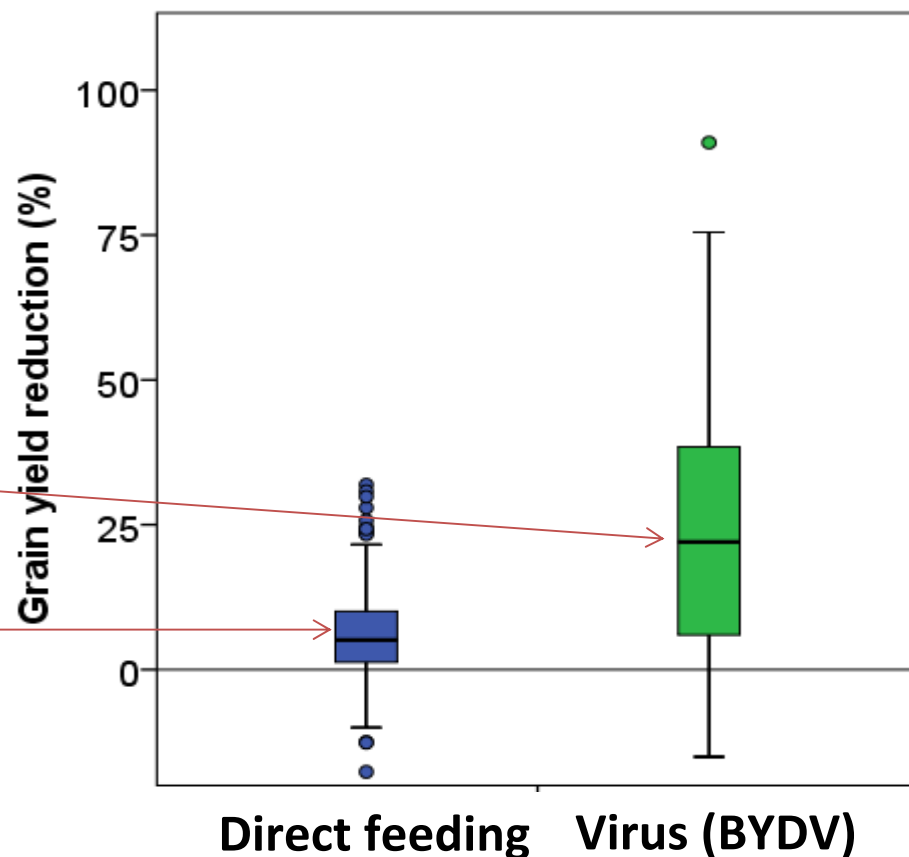
Impact (yield loss) of aphid damage on cereals

Median values

Virus transmission 21%

Direct feeding 6%

But regionally variable!





Virus transmission

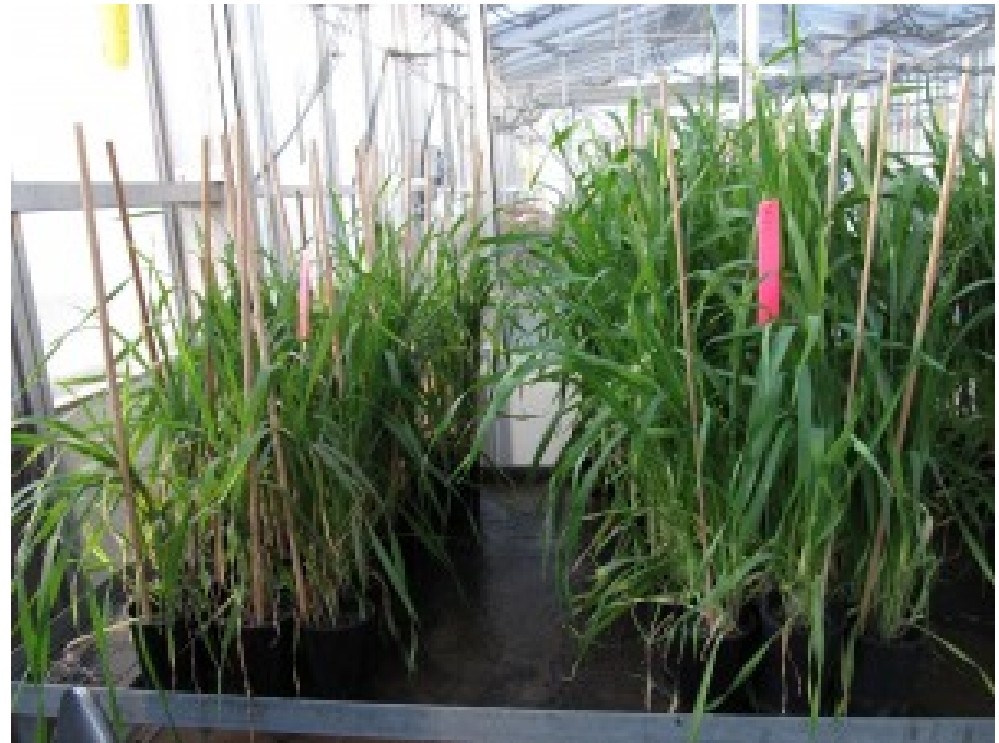
Yellow dwarf viruses

- Transmitted by aphids
- Yield losses
 - early infection 12 - 79% (rare)
 - infected post-tillering 6-9%
- Summer/autumn “green bridge” increases aphid and virus survival



Direct feeding

- Retarded growth through nutrient removal
- Honeydew & sooty mould
- Toowoomba 2012 expt: early vs late infestation
- Impact: dry matter, # tillers, # heads, seed weight reduced after early prolonged infestation



Early (Z12) and
continuous
infestation

Late (Z24)
infestation



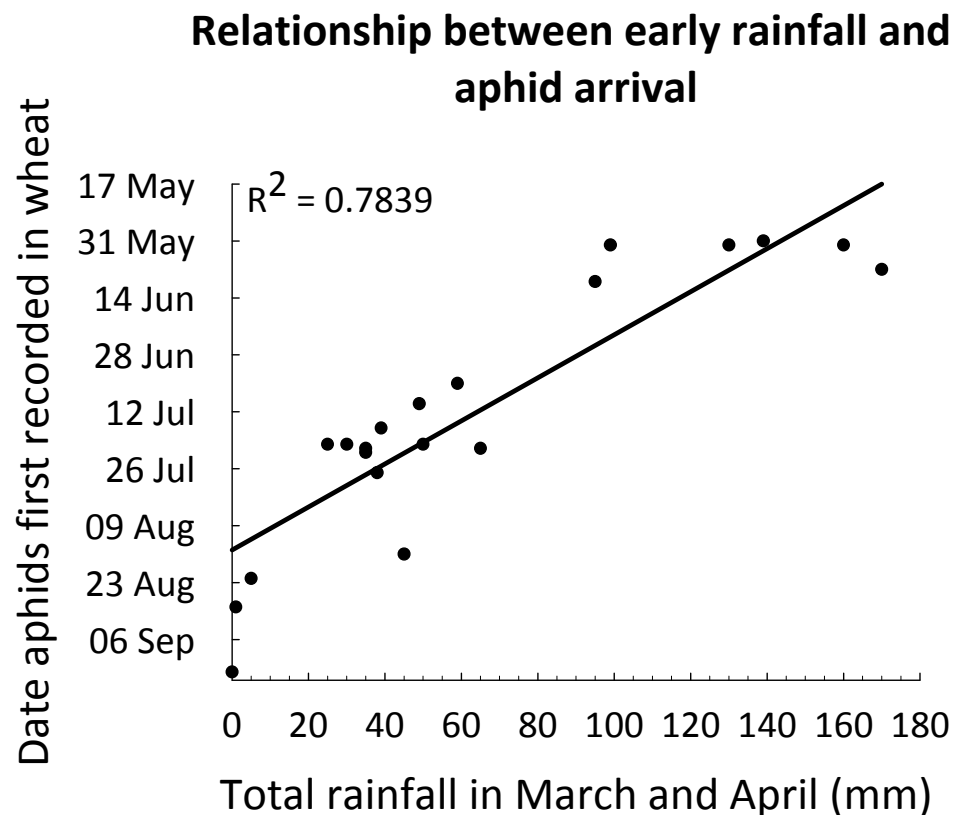
Aphid management considerations

- timing
- beneficials
- monitoring
- thresholds

The weather and timing of aphid invasions

Strong correlations:

- Early autumn rains can bring earlier invasions
- Earlier invasions can bring BYDV



Source: Thackray et al 2009 on Oat aphid



Common aphid beneficials

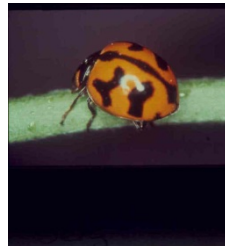
Lacewings



Hoverflies



Ladybirds



Wasp parasitoids





Monitoring aphids

- Monitor and record
 - Aphids and beneficials
 - Changes in pop'n dynamics?
- Repeat sampling
 - Seedling, tillering, ripening
- 3-6 locations
 - 5 random plants at each





Suggested thresholds



High virus risk (region & weather)?

For susceptible varieties - zero tolerance at crop establishment stage

Early crop stage (NGA: Qld/NSW)

20% of tillers - 10 + aphids

Late crop stage (WA)

50% of tillers - 15 + aphids

**NOTE: Populations can change quickly
& often don't reach thresholds**





Management considerations

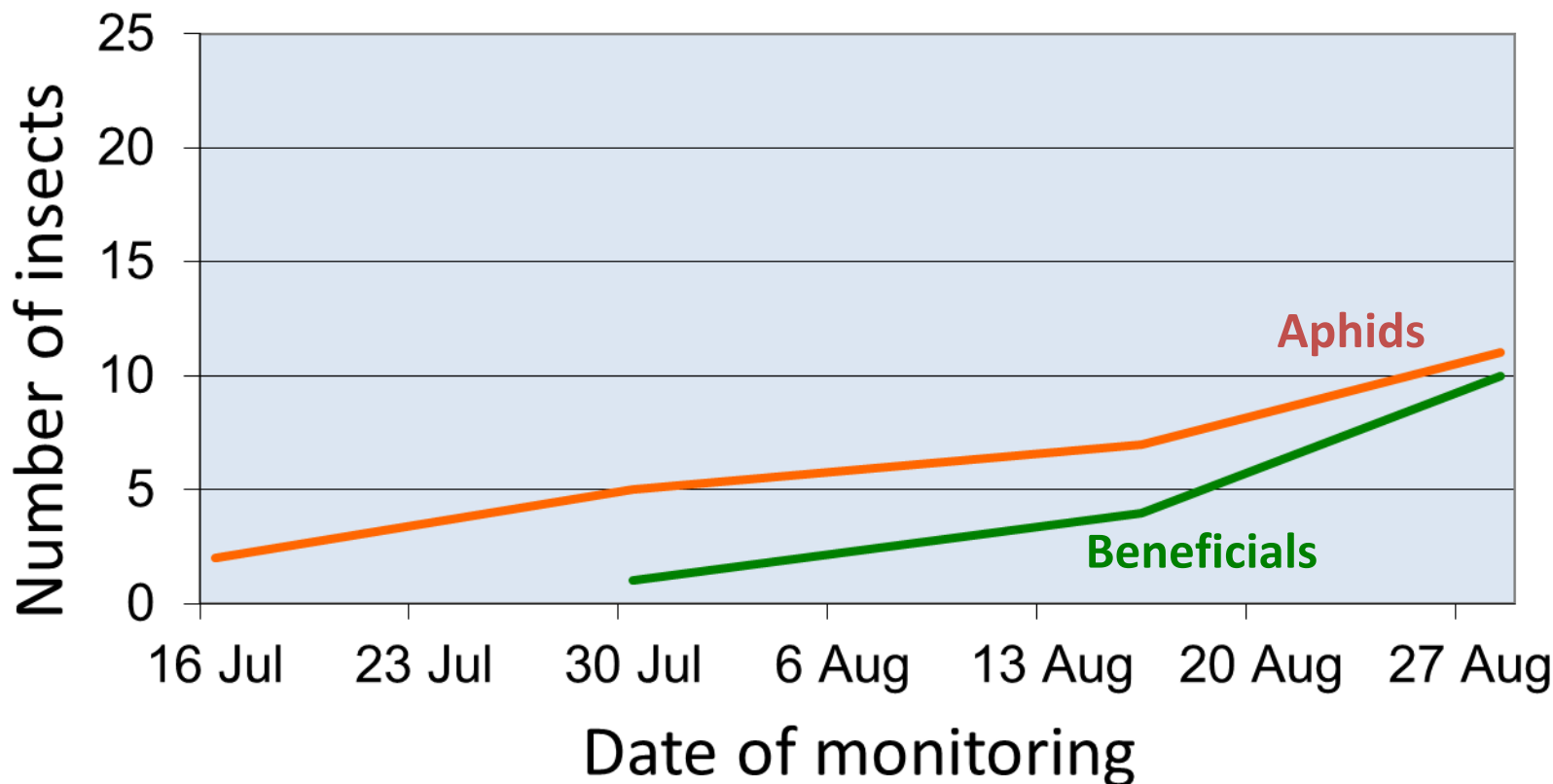
- Weather conditions?
- Virus risk?
- Crop development stage?
- Is the population increasing?
- Beneficial activity?
- Intensity, duration and distribution of infestation?
- Chemical choices (pirimicarb, seed dressings, border sprays)



When do I control aphids in my crop?



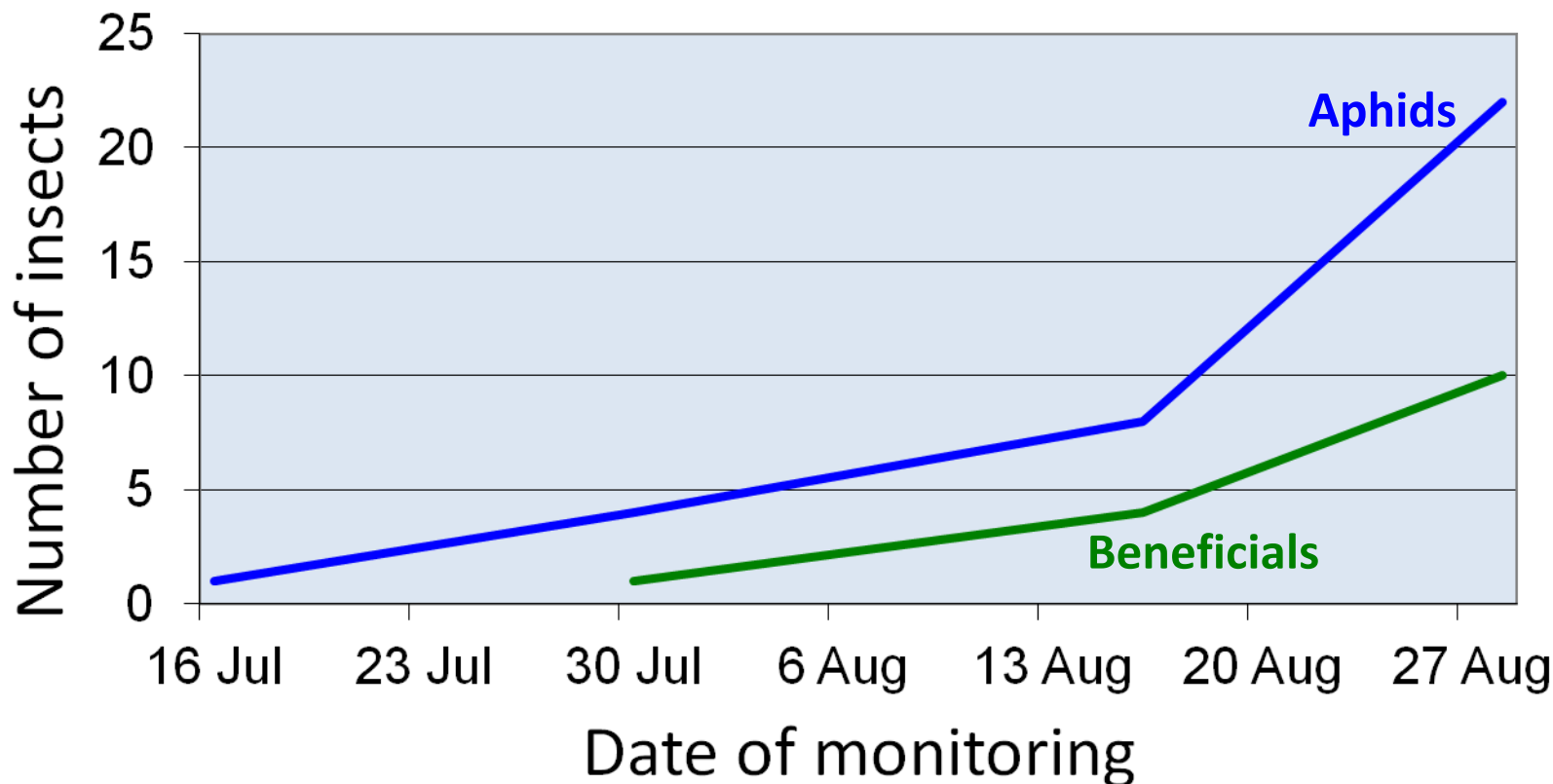
Aphids and beneficial insect numbers



When do I control aphids in my crop?



Aphids and beneficial insect numbers





Best Bet Table: Aphids

Pre-season	Establishment	Winter	Spring
Remove green bridge (weed & volunteer hosts)	<u>High (virus) risk</u> seed dressing SPs up to 8-10 wks Early control along edges or patches may delay infestation	<u>High risk</u> Monitor/record density aphids and beneficials Delay chemical control if rain (>20 mm) forecast Selective insecticide	<u>High risk</u> Monitor/record density aphids and beneficials Thresholds Selective insecticide Infestations later than milky grain: No yield loss



Caterpillars





Armyworms

Armyworms

- Smooth bodied
- 3 stripes collar



Damage

- Defoliation at establishment
- Sever (barley) heads



Armyworms



- Monitor
 - Sweep net, ground searches
 - Scalloped leaves, droppings
 - Increase frequency at ripening
- Thresholds
 - Barley – 2 med sized armyworm/m²
 - Wheat and oats - 10 larvae/m²



Helicoverpa



Helicoverpa

- Three species
- Mostly *H. punctigera*
- Prominent black hairs
- Last spiracle in dark area



Damage

- Graze on exposed tips
- Economic impact is rare





Caterpillar pests - IPM opportunities

- Early recognition of problem
 - Use “pest alerts”
 - Smaller larvae easier to control
- Selective chemistry
 - preserve beneficials to do control for free
- Biopesticide
 - NPV effective for *Helicoverpa*, not for armyworm





Best Bet Table: Armyworm

Establishment	Winter	Spring
<p><u>High risk:</u></p> <p>(cereals into standing stubbles in wet years)</p> <p>Monitor for leaf scalloping</p>	<p><u>High risk</u></p> <p>Monitor for larvae at dusk with sweep net/bucket</p> <p>Ground search for larvae and droppings</p> <p>Look for scalloped leaf margins</p> <p>Control larvae when small</p>	<p><u>High risk</u></p> <p>↑ monitoring as crop dries down</p> <p>Consider crop stage before control</p> <p>Control late in day when larvae feeding</p>



Key messages

- Control “**green bridge**” and weeds can be very effective in reducing aphids, virus, Bryobia and caterpillars (cultural control)
- Understanding the role of **weather** is vital in predicting pest problems
- **Monitoring** is particularly important because of the transient nature of pests
- For winter and spring pests, **beneficial insects** can play a powerful role and should be monitored (biological control)
- The use of selective insecticides helps to maintain beneficial insect activity.